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(54) Combined microwave oven and extractor

Kombinierter Mikrowellenofen und Absaugvorrichtung

Four à micro-ondes combiné avec dispositif d'extraction

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Description

[0001] The present invention relates to a combined microwave oven and extractor comprising an inner casing defining a cooking chamber, an electrical component compartment an outer casing enclosing the inner casing so as to define an air duct therebetween and having an air-duct inlet opening downwards and an air-duct outlet, and a fan for driving air along the air duct from the inlet to the outlet, the air duct having a portion extending vertically beside the cooking chamber and the fan being located in said vertically extending portion of the air duct.

[0002] Microwave ovens are well-known and are commonly found in kitchens. Recently, a microwave oven serving, both as a cooking appliance and as an extractor for removing fumes generated by a gas cooker and food smells, has been developed. Such a microwave oven is generally installed over a cooking appliance such as a gas cooker and is, therefore, called an OTR (over-the-range) microwave oven.

[0003] Figure 1 shows a kitchen in which a microwave oven serving as an extractor is installed and Figure 2 is a rear perspective view of the microwave oven shown in Figure 1. A gas cooker 20 is installed between two sinks 10 in a kitchen. A cupboard unit 40 is mounted over the sinks 10. A space is provided in the middle of the cupboard unit 40 and the microwave oven 30 is accommodated in the space.

[0004] A suction grill 32 is installed in top of the front of the microwave oven 30 and a suction port 31 is formed in the bottom of the microwave oven 30. An exhaust port 36 is formed in the top of the microwave oven 30. As shown in Figure 3, an air duct 38 is provided in the microwave oven 30. The air duct 38 extends from the suction port 31 to the exhaust port 36. A cavity 37 is formed in the rear upper portion of the microwave oven 30 and a fan unit 35 is accommodated in the cavity 37.

[0005] The fan unit 35 comprises a motor 34 and a pair of crossflow fans 33, driven by the motor 34. A coupling member 39 is installed at the exhaust port 36. The coupling member 39 connects the microwave oven 30 to a flue (not shown).

[0006] When the fan unit 35 is operating, fumes generated by the gas cooker 20 are drawn into the air duct 38 through the suction port 31 and the suction grill 32, and are then exhausted through the exhaust port 36. The exhausted fumes are discharged out of the kitchen via the flue.

[0007] Such a microwave oven suffers from the disadvantage that the cooking chamber is reduced in size in order to accommodate the fan unit.

[0008] Furthermore, since the fan unit is far from the suction port, it draws air through the suction port inefficiently.

[0009] US-A-4720622 discloses a combined microwave oven and extractor with a fan mounted in a vertically extending portion of a duct. A separate fan is used for cooling the electrical components of the oven.

5 [0010] A combined microwave oven and extractor according to the present invention is characterised in that the electrical component compartment is in open communication with the air duct at the entry side of the fan such that operation of the fan draws cooling air through the component compartment into the air duct.

10 [0011] Preferably, the fan is an axial-flow fan. Conveniently, a motor for driving the fan is also located in the vertical portion of the air duct. The fan may be directly mounted to the motor's shaft.

15 [0012] A further axial-flow fan may be included, in which case the fans may be mounted at opposite ends of a drive shaft of a motor, which shaft extends in opposite directions from the motor.

20 [0013] Embodiments of the present invention will now be described, by way of example, with reference to Figures 4 to 6 of the accompanying drawings, in which:-

Figure 1 shows a extractor microwave oven installed in a kitchen;

Figure 2 is a rear perspective view of the microwave oven of Figure 1;

Figure 3 is a schematic sectional view of the microwave oven of Figure 1;

Figure 4 is a perspective view of a first microwave oven according to the present invention;

Figure 5 is a sectional view of the microwave oven of Figure 4; and

Figure 6 shows a second microwave oven according to the present invention.

25 [0014] Referring to Figures 4 and 5, as with the microwave oven 30 of Figure 1, a microwave oven 130 is installed over a gas cooker and both cooks food and exhausts fumes generated by the gas cooker from the kitchen.

30 [0015] The microwave oven 130 has an inner casing 152, forming a cooking chamber 160, and an outer casing 151 enclosing the inner casing 152. A suction grill 132 is installed at the top of the front of the outer casing 151 and a suction port 131 is formed in the bottom of the outer casing 151. A coupling member 139, having an exhaust port 137, is installed in the top of the outer casing 151. A flue 150 is connected to the coupling member 139.

35 [0016] The space between the inner casing 152 and the outer casing 151 forms an air duct 180.

40 [0017] A fan unit 135 is installed in the duct on the left-hand side of the inner casing 152. The fan unit 135 comprises a motor 134 and a pair of axial-flow fans 133 installed on the shaft of the motor 134. The shaft of the motor 134 is disposed vertically and the fans 133 are disposed respectively at upper and lower ends of the shaft. The fans 133 each have, as shown in Figure 4, helical blades disposed on the curved surface of a vertical cylinder. Thus, as the fans 133 are rotated by the motor 134, the air in the air duct 180 is driven upwards by the fans 133.

[0018] An electrical component compartment 170, housing electrical components including a magnetron 171 and a high-voltage transformer 172 for driving the magnetron 171, is formed on the right-hand side of the cooking chamber 160. Ventilation holes 170a, 170b are formed respectively in the top and bottom walls of the component compartment 170. The suction grill 132 communicates with the component compartment 170 through the upper ventilation hole 170a and the component compartment 170 communicates with the air duct 180 through the lower ventilation hole 170b. Therefore, air drawn in through the suction grill 132 is drawn into the component compartment 170 through the upper ventilation hole 170a, and the air drawn into the component compartment 170 is drawn into the air duct 180 through the lower ventilation hole 170b.

[0019] When a user operates the fan unit 135 (which may be done without also operating the magnetron 171), the fans 133 are rotated by the driving motor 134. Fumes generated by the gas cooker are drawn into the air duct 180 through the suction port 131 and the suction grill 132. The fumes drawn through the suction port 131 are driven along the air duct 180 and discharged into the flue 150 through the exhaust port 137. The air, and any fumes, drawn through the suction grill 132 are drawn into the air duct 180 via the component compartment 170 and then discharged into the flue 150 through the exhaust port 137. The flue 150 conveys the fumes harmlessly away from the kitchen.

[0020] Referring to Figure 6, parts other than the fan unit 135a, which here comprise a motor 134a and a single axial-flow fan 133a, are the same as in the first embodiment shown in Figures 4 and 5.

[0021] Since the fan unit is disposed beside the cooking chamber, the cooking chamber does not need to be narrowed. Furthermore, since the fan unit is disposed near the suction port, the fume extraction efficiency is improved. Additionally, the component compartment is cooled during fume extraction operation.

[0022] As mentioned above, the size of the cooking chamber 170 is not compromised by the fan unit and extraction of fumes is carried out more effectively.

Claims

1. A combined microwave oven and extractor comprising an inner casing (152) defining a cooking chamber (160), an electrical component compartment (170) an outer casing (151) enclosing the inner casing so as to define an air duct (180) therebetween and having an air-duct inlet (131) opening downwards and an air-duct outlet (139), and a fan (133; 133a) for driving air along the air duct (180) from the inlet (131) to the outlet (139), the air duct (180) having a portion extending vertically beside the cooking chamber (160) and the fan (133; 133a) being located in said vertically extending portion of

5 the air duct (180), **characterised in that** the electrical component compartment (170) is in open communication with the air duct (180) at the entry side of the fan (133, 133a) such that operation of the fan (133) draws cooling air through the component compartment (170) into the air duct (180).

2. A combined microwave oven and extractor according to claim 1, wherein the fan is an axial-flow fan (133).
3. A combined microwave oven and extractor according to claim 2, including a further axial-flow fan (133), the fans (133) being mounted at opposite ends of a drive shaft of a motor (134), which shaft extends in opposite directions from the motor (134).

Patentansprüche

1. Kombination aus Mikrowellenherd und Absaugeinrichtung, die ein inneres Gehäuse (152), das eine Kochkammer (160) aufweist, eine Kammer (170) für elektrische Bauteile, ein äußeres Gehäuse (151), das das innere Gehäuse umschließt, um eine Luftleitung (180) dazwischen zu bilden, und einen Luftleitungseinlass (131), der sich nach unten öffnet, sowie einen Luftleitungsauslass (139) aufweist, und ein Gebläse (133; 133a) umfasst, das die Luft entlang der Luftleitung (180) von dem Einlass (131) zu dem Auslass (139) leitet, wobei die Luftleitung (180) einen Abschnitt aufweist, der sich vertikal neben der Kochkammer (160) erstreckt, und das Gebläse (133, 133a) in dem sich vertikal erstreckenden Abschnitt der Luftleitung (180) angeordnet ist, **dadurch gekennzeichnet, dass** die Kammer (170) für elektrische Bauteile in offener Verbindung mit der Luftleitung (180) an der Eintrittsseite des Gebläses (133, 133a) steht, so dass durch Betätigung des Gebläses (133) Kühlluft über die Kammer (170) für Bauteile in die Luftleitung (180) gesaugt wird.
2. Kombination aus Mikrowellenherd und Absaugeinrichtung nach Anspruch 1, wobei das Gebläse ein Axialgebläse (133) ist.
3. Kombination aus Mikrowellenherd und Absaugeinrichtung nach Anspruch 2, die ein weiteres Axialgebläse (133) enthält, wobei die Gebläse (133) an einander gegenüberliegenden Enden einer Antriebswelle eines Motors (134) angebracht sind und sich die Welle in einander entgegengesetzten Richtungen von dem Motor (134) erstreckt.

Revendications

1. Appareil combinant un four à micro-ondes et un extracteur, comprenant un boîtier intérieur (152) définissant une chambre de cuisson (160), un compartiment de composants électriques (170), un boîtier extérieur (151) enfermant le boîtier intérieur de manière à définir un conduit d'air (180) entre lesdits boîtiers et comportant une entrée de conduit d'air (131) s'ouvrant vers le bas et une sortie de conduit d'air (139), et un ventilateur (133 ; 133a) destiné à entraîner de l'air le long du conduit d'air (180) de l'entrée (131) vers la sortie (139), le conduit d'air (180) comportant une portion s'étendant verticalement à côté de la chambre de cuisson (160) et le ventilateur (133; 133a) étant placé dans ladite portion, s'étendant verticalement, du conduit d'air (180), **caractérisé en ce que** le compartiment de composants électriques (170) est en communication ouverte avec le conduit d'air (180) du côté de l'entrée du ventilateur (133 ; 133a) de telle sorte que le fonctionnement du ventilateur (133) amène de l'air de refroidissement via le compartiment de composants (170) dans le conduit d'air (180).
25
2. Appareil combinant un four à micro-ondes et un extracteur selon la revendication 1, dans lequel le ventilateur est un ventilateur à flux axial (133).
3. Appareil combinant un four à micro-ondes et un extracteur selon la revendication 2, incluant un ventilateur à flux axial (133) supplémentaire, les ventilateurs (133) étant montés à des extrémités opposées d'un arbre d'entraînement d'un moteur (134), lequel arbre s'étend dans des directions opposées par rapport au moteur (134).
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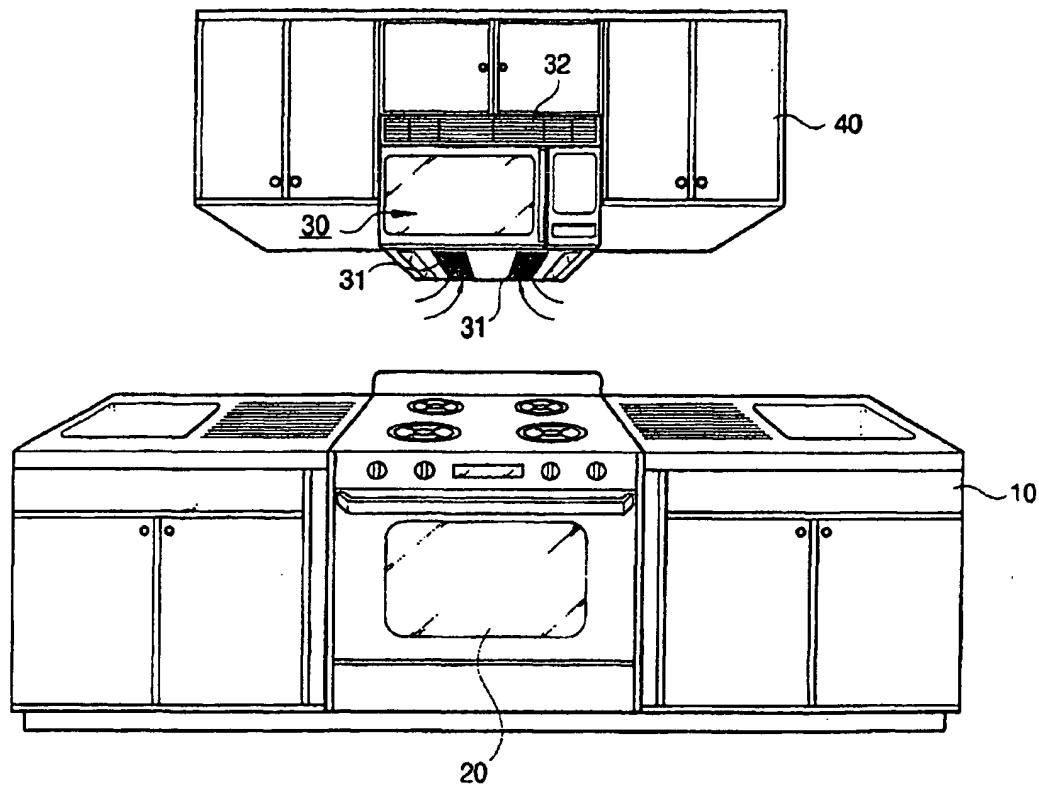
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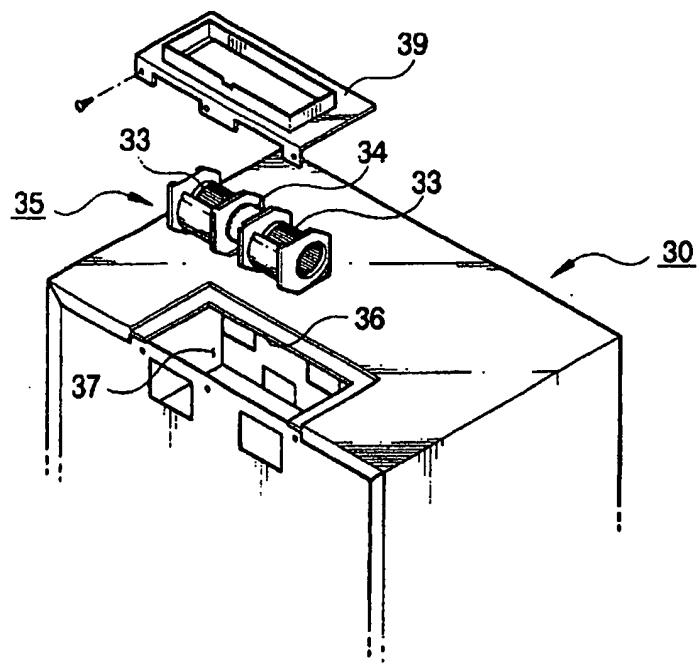
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FIG. 1
(PRIOR ART)



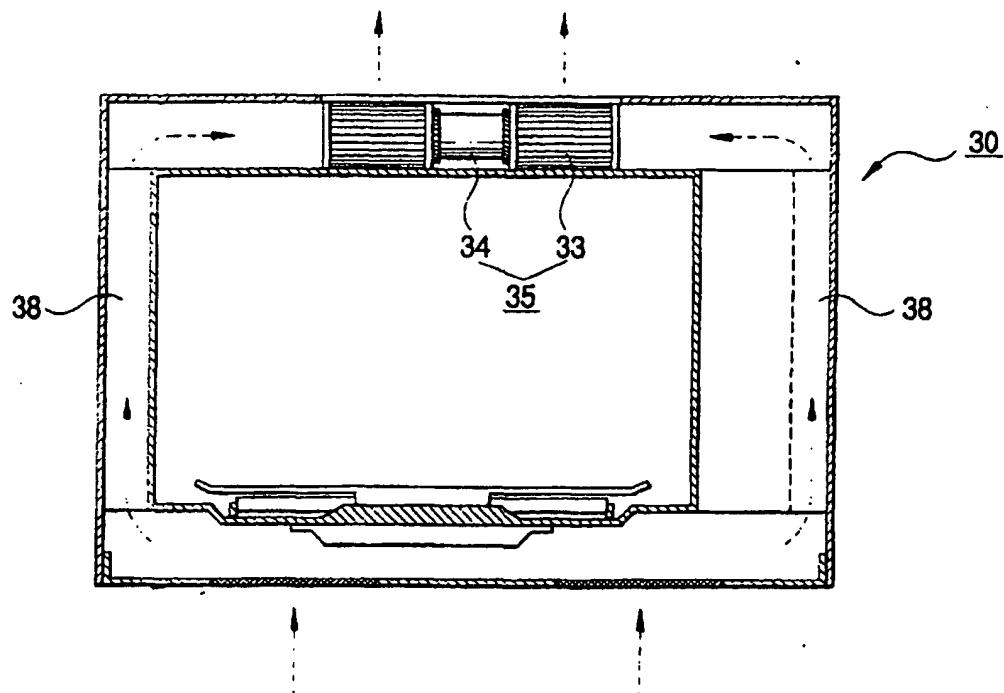
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FIG. 2
(PRIOR ART)



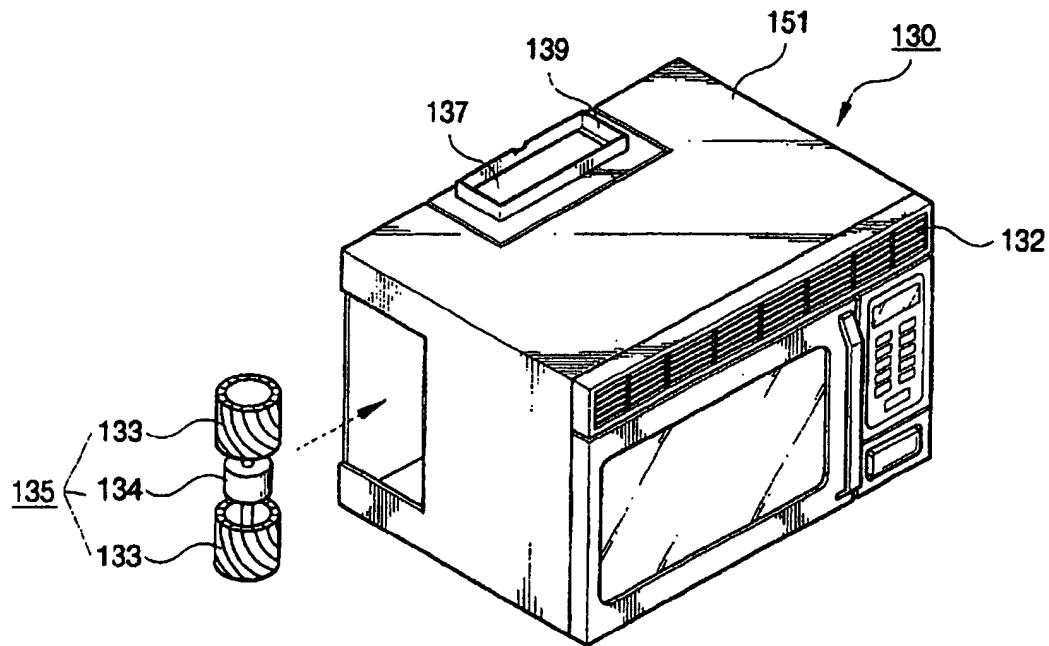
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FIG. 3
(PRIOR ART)



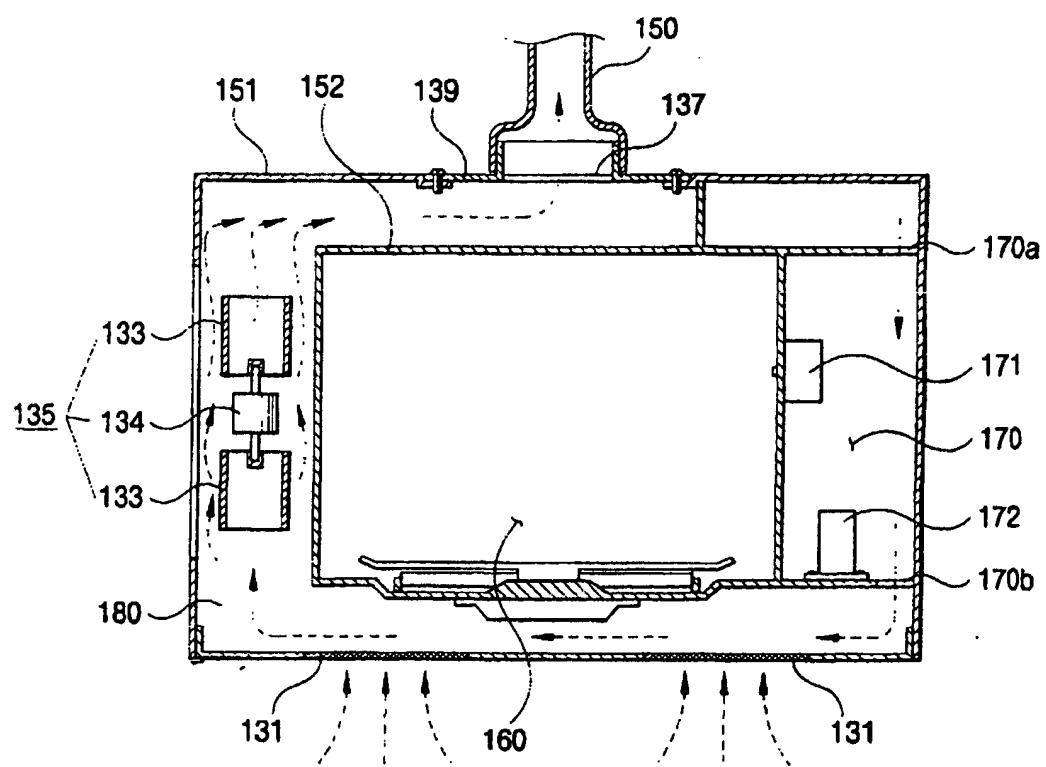
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FIG. 4



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FIG. 5



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FIG. 6

